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60,130-2399; 02MRA0191

IN THE CLAIMS

1. (Currently Amended) A differential locking mechanism for a drive axle comprising:

a differential including a differential gear assembly supported within a differential case;

a pair of axle shafts driven by said differential gear assembly for rotation about an axis;

a shift collar movable between an unlocked position where speed differentiation between said pair of axle shafts is permitted and a locked position wherein said shift collar directly engages said differential case such that said differential case, said shift collar, and said pair of axle shafts are fixed for rotation together; ~~and~~

an electronic actuator responsive to an electronic signal to move said shift collar from said unlocked position to said locked position; and

a resilient member that returns said shift collar to said unlocked position, said resilient member surrounding an outer end portion of said shift collar.

2. (Previously Presented) The differential locking mechanism as set forth in claim 1 wherein said electronic actuator includes a coil mounted to an axle component and surrounding said shift collar wherein said electronic signal powers said coil to move said shift collar.

3. (Previously Presented) The differential locking mechanism as set forth in claim 2 wherein said differential case includes a first case half and a second case half and wherein said electronic actuator selectively moves said shift collar to engage one of said first and second case halves.

4. (Currently Amended) The differential locking mechanism as set forth in claim 2 ~~including a~~wherein said resilient member ~~for~~ automatically ~~returning~~ returns said shift collar to said unlocked position when said coil is not powered.

5. (Previously Presented) The differential locking mechanism as set forth in claim 4 wherein said resilient member reacts between said coil and an outboard end of said shift collar.

6. (Previously Presented) The differential locking mechanism as set forth in claim 5 including a washer fixed to said outboard end for reacting with said resilient member.

7. (Currently Amended) The differential locking mechanism as set forth in claim 2 wherein said shift collar includes an inboard end having a splined surface and an outboard end for supporting ~~a~~ said resilient ~~return~~ member, said inboard end having a greater diameter than said outboard end.

8. (Previously Presented) The differential locking mechanism as set forth in claim 7 wherein said coil defines a central bore surrounding said shift collar at said outboard end, said shift collar moving in an inboard direction in response to said coil being powered via said electronic signal such that said splined surface of said inboard end engages a mating splined surface formed on said differential case such that said differential case and said pair of axle shafts are locked together for rotation about said axis.

9. (Currently Amended) A drive axle assembly with a locking differential comprising:

a driving input defining a longitudinal axis;

a carrier including a pinion gear driven by said driving input and a ring gear in meshing engagement with said pinion gear;

a differential including a differential gear assembly supported by a differential case wherein said ring gear is attached to said differential case to drive said differential gear assembly;

a pair of axle shafts driven by said differential gear assembly for rotation about a lateral axis, said lateral axis being transverse to said longitudinal axis; and

a locking mechanism including a shift collar and an electronic actuator for controlling movement of said shift collar wherein said shift collar is movable between an unlocked position where speed differentiation between said pair of axle shafts is permitted and a locked position wherein said shift collar is moved into locking engagement with said differential case in response to an electronic signal such that said differential case, said shift collar, and said pair of axle shafts are fixed for rotation together about said lateral axis, and wherein said locking mechanism includes a resilient member that returns said shift collar to said unlocked position, said resilient member surrounding said shift collar and reacting between said electronic actuator and said shift collar.

10. (Previously Presented) The drive axle assembly as set forth in claim 9 wherein said electronic actuator comprises a coil surrounding said shift collar wherein said electronic signal powers said coil to move said shift collar.

11. (Previously Presented) The drive axle assembly as set forth in claim 10 including an axle housing for substantially enclosing said carrier and said pair of axle shafts wherein said coil is supported by said axle housing.

12. (Previously Presented) The drive axle assembly as set forth in claim 11 wherein said shift collar includes an inboard end having a splined surface and an outboard end, said inboard end having a greater diameter than said outboard end and wherein said coil defines a central bore surrounding said shift collar at said outboard end, said shift collar moving in an inboard direction in response to said coil being powered via said electronic signal such that said splined surface of said inboard end engages a mating splined surface formed on said differential case such that said differential case is locked to said pair of axle shafts.

13. (Previously Presented) A drive axle assembly with a locking differential comprising:

a driving input defining a longitudinal axis;

a carrier including a pinion gear driven by said driving input and a ring gear in meshing engagement with said pinion gear;

a differential including a differential gear assembly supported by a differential case wherein said ring gear is attached to said differential case to drive said differential gear assembly;

a pair of axle shafts driven by said differential gear assembly for rotation about a lateral axis, said lateral axis being transverse to said longitudinal axis;

a locking mechanism including a shift collar and an electronic actuator for controlling movement of said shift collar wherein said shift collar is movable between an unlocked position where speed differentiation between said pair of axle shafts is permitted and a locked position, and wherein said shift collar is moved into locking engagement with said differential case in response to an electronic signal such that said differential case, said shift collar and said pair of axle shafts are fixed for rotation together about said lateral axis, and wherein said electronic actuator comprises a coil surrounding said shift collar wherein said electronic signal powers said coil to move said shift collar;

wherein said shift collar includes an inboard end having a splined surface and an outboard end, said inboard end having a greater diameter than said outboard end and wherein said coil defines a central bore surrounding said shift collar at said outboard end, said shift collar moving in an inboard direction in response to said coil being powered via said electronic signal such that said splined surface of said inboard end engages a mating splined surface formed on said differential case such that said differential case is locked to said pair of axle shafts;

an axle housing for substantially enclosing said carrier and said pair of axle shafts wherein said coil is supported by said axle housing; and

a resilient member for automatically returning said shift collar to said unlocked position when said coil is not powered, said resilient member reacting between said coil and a washer mounted to said outboard end of said shift collar.

14. (Previously Presented) The drive axle assembly as set forth in claim 13 wherein said differential case includes a first case half and a second case half attached to the first case half and wherein said electronic actuator selectively draws said shift collar into direct engagement with one of said first and second case halves.

15. (Previously Presented) The drive axle assembly as set forth in claim 14 including a pair of side gears with one side gear being fixed to each of said pair of axle shafts and wherein said differential gear assembly includes a differential spider having four support shafts orientated in an overall shape of a cross and four differential pinion gears in meshing engagement with said side pair of gears with one of said four differential pinion gears being supported on each of said four support shafts and wherein said ring gear is fixed to one of said first and second case halves such that said ring gear, said differential case, said differential spider, and said four differential pinion gears all rotate as one unit to transfer power to said pair of axle shafts via said pair of side gears when no speed differentiation is required and when speed differentiation is required said four differential pinion gears rotate on respective support shafts to speed up rotation of one of said pair of axle shafts via a respective one of said pair of side gears while slowing rotation of the other of said pair of axle shafts via a respective other of said pair of side gears.

16. (Previously Presented) The drive axle assembly as set forth in claim 15 wherein one of said pair of axle shafts includes a set of inboard splines and a set of outboard splines, said set of inboard splines cooperating with said respective one of said pair of side gears to fix said one of said pair of side gears for rotation with said one of said pair of axle shafts and said set of outboard splines cooperating with a splined bore formed inside said inboard end of said shift collar.

17. (Currently Amended) A method for controlling a differential lock assembly for a drive axle comprising the steps of:

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(a) providing a differential for driving a pair of axle shafts, the differential including a differential gear assembly supported within a differential case and a shift collar for selective engagement with the differential case;

(b) energizing a coil surrounding the shift collar;

(c) in response to step (b) moving the shift collar from an unlocked position where speed differentiation between the pair axle shafts is permitted under predetermined conditions to a locked position where ~~both of~~ the pair of axle shafts rotate at a common speed by fixing the shift collar to the differential case; and

(d) providing a resilient member that surrounds an end portion of the shift collar and reacts between the coil and a portion of the shift collar, and returning the shift collar from the locked position to the unlocked position with the resilient member when the coil is no longer energized.

18. (Previously Presented) The method as set forth in claim 17 including the step of automatically returning the shift collar to the unlocked position when the coil is not energized.

19. (Previously Presented) The method as set forth in claim 18 including the step of providing driving input to the differential by providing a pinion gear for driving a ring gear attached to the differential case which comprises a first case half and a second case half; and wherein step (c) further includes moving the shift collar into direct engagement with one of the first and second case halves to fix the shift collar for rotation with the first and second case halves.

20. (Currently Amended) The method as set forth in claim 18 including ~~the step of providing a resilient member to return the shift collar to the unlocked position when the coil is not powered and~~ reacting the resilient member between the coil and an outboard end of the shift collar.

21-23. (Cancelled)